Supplementary Information for

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Mineralogy and Fluvial History of the Watersheds of Gale, Knobel, and Sharp craters: A Regional Context for MSL Curiosity's Exploration

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S1.0 Crater counting methods, additional detail

Standard techniques were used that exclude secondary crater clusters and rays and that also exclude from fitting procedures craters with sizes near the image resolution. In general, fits were made only over the portion of the cumulative frequency distribution that was linear in log-log space (main text, Figure 4). Typically, the "rollover", or shallowing of the slope due to image resolution effects, was at approximately 10 times the image resolution. This "rollover", i.e. the smaller craters in the counts, was excluded when computing fits.

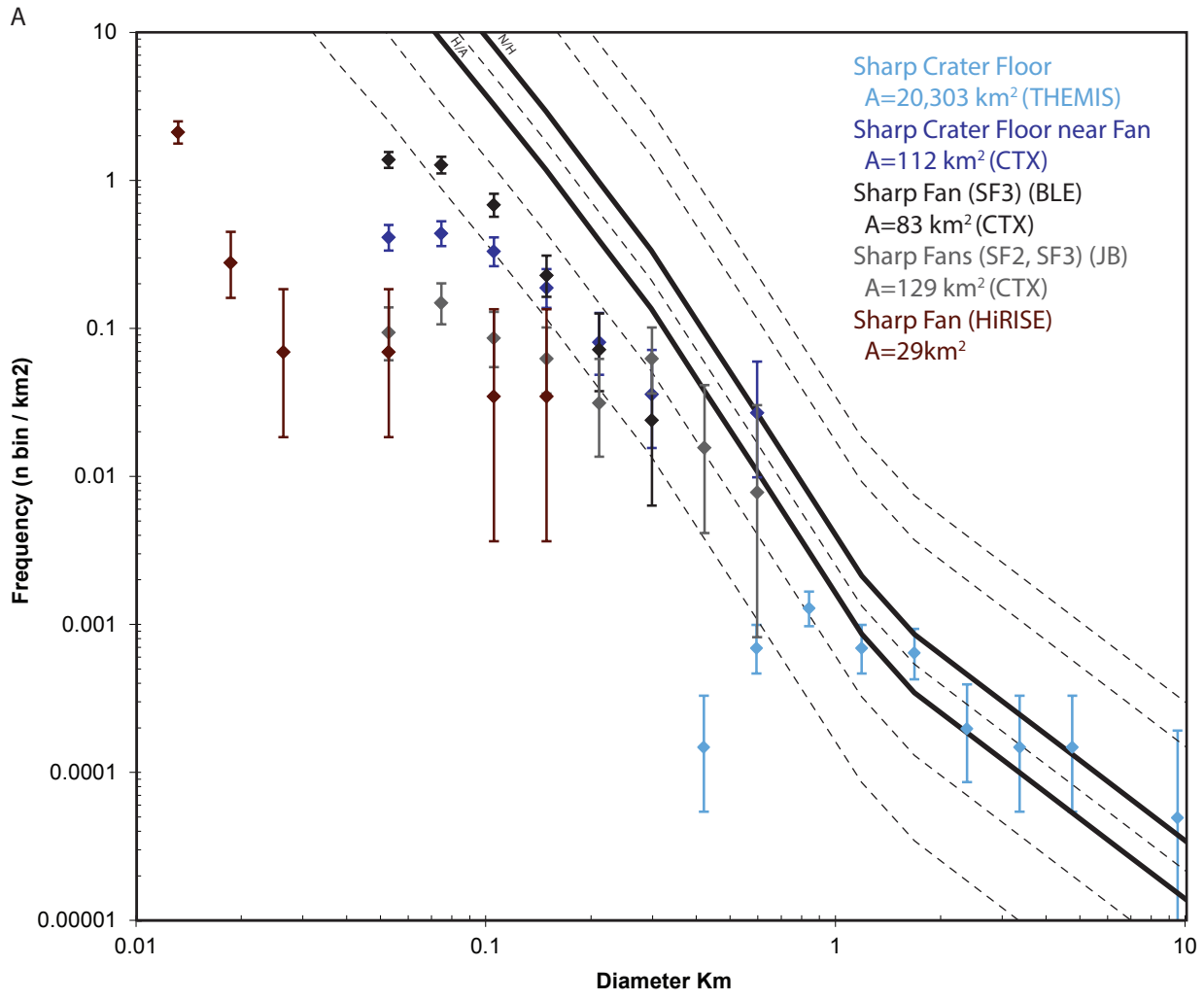
We provide incremental plots corresponding to the same counts made in Figure 4 (Supplementary Figure 1). Incremental plots have been favored by Hartmann (2005) as a way of better examining the "steep branch" of a cumulative frequency diagram with slopes of -3 to -4 instead of -2. We use a modified version of Hartmann's incremental plots with period boundaries and plotting approach from Fassett & Head (2008).

References

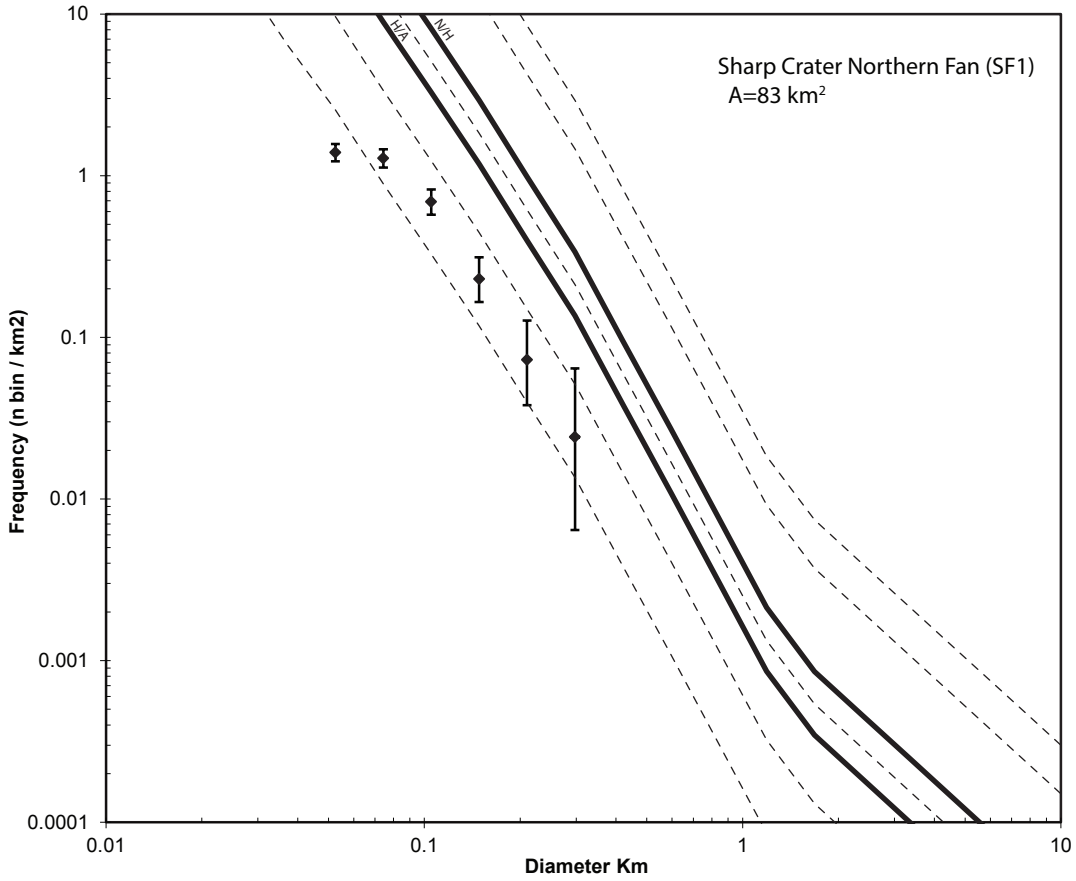
Fassett, C.I. and J.W. Head III. The timing of martian valley network activity: Constraints from buffered crater counting. *Icarus* 195, 61–89.

Hartmann, W.K. 2005. Martian cratering 8: Isochron refinement and the chronology of Mars. *Icarus* 174, 294–320.

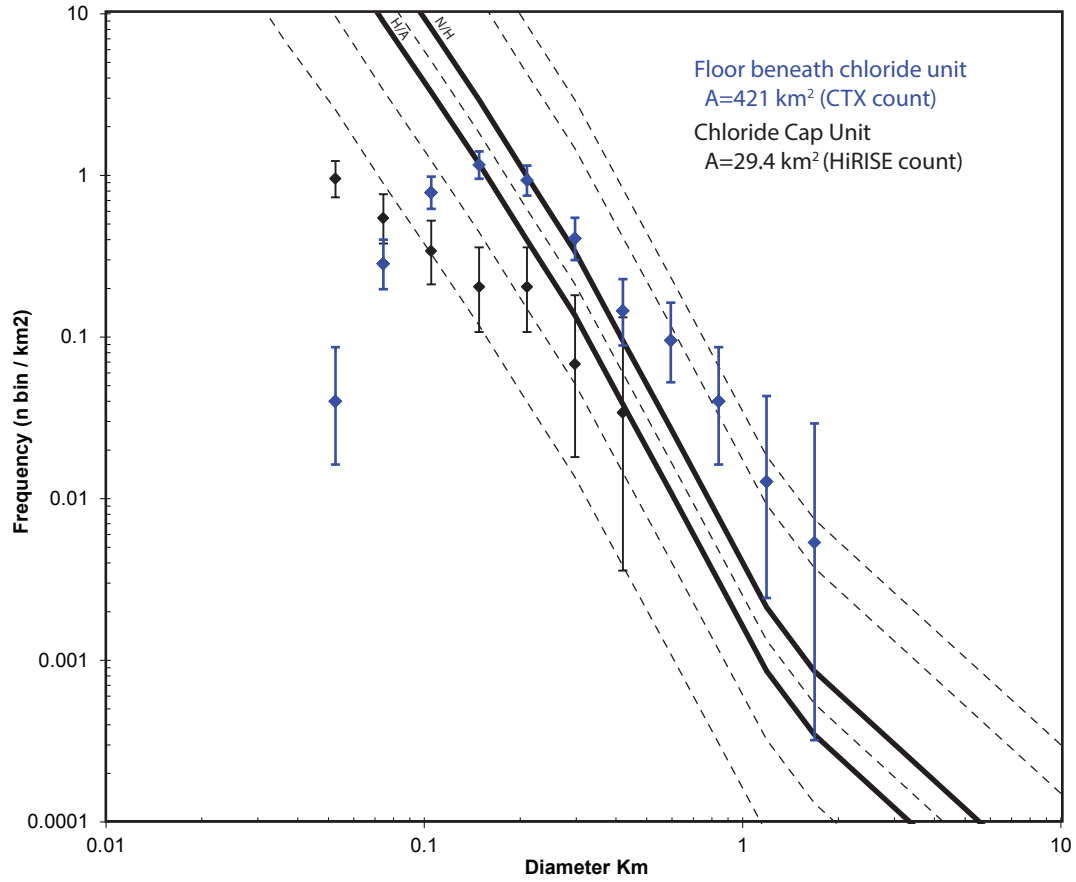
Supplementary Figure 1. Incremental crater statistics plots, binned in square root of two intervals (D=2^0.5) for (a) the south Sharp crater fans, (b) the western Sharp crater fan (SF1), (c) the cap rock overlying the chloride unit and the floor beneath, (d) a large crater with fill superposed on the Sharp watershed, and (e) a large crater with fill superposed on the Gale crater watershed.



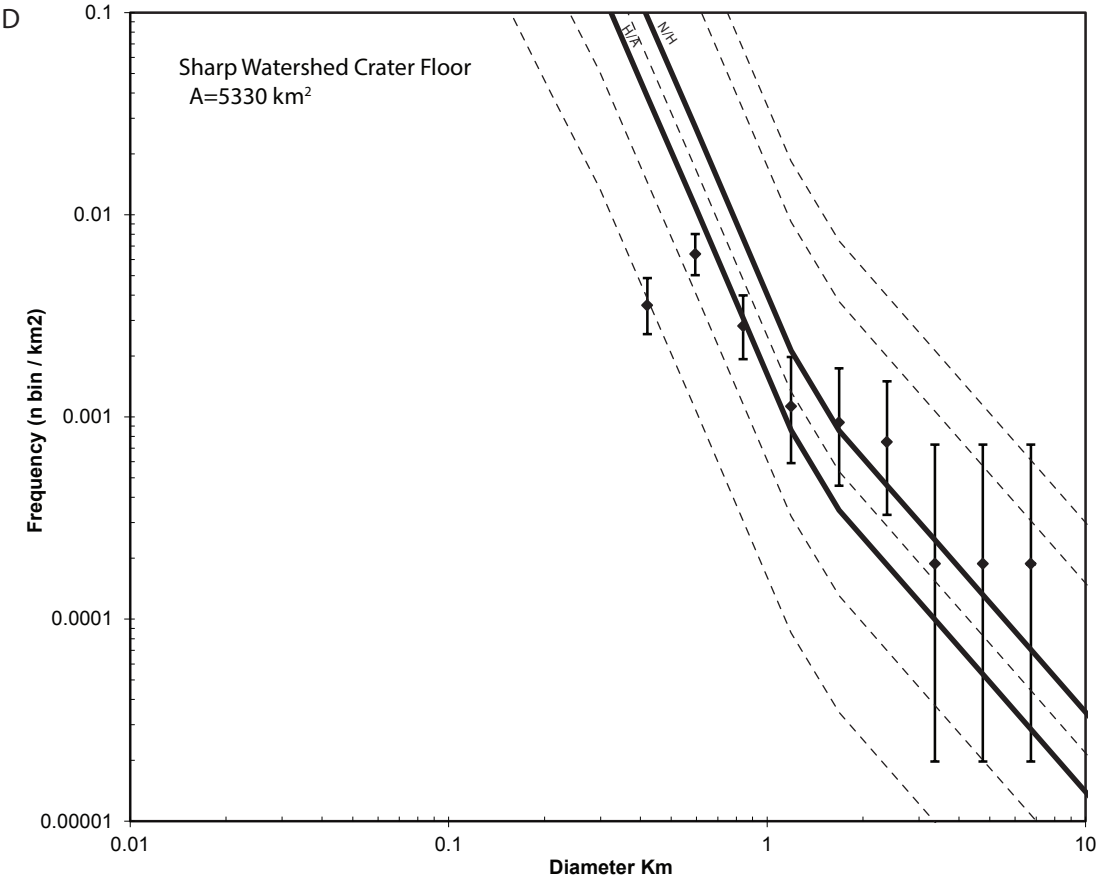
B


Sharp Crater Northern Fan (SF1)
A=83 km²
H/A
N/H
Frequency (n bin / km2)
Diameter Km
10
1
0.1
0.01
0.001
0.0001
0.01
0.1
1
10

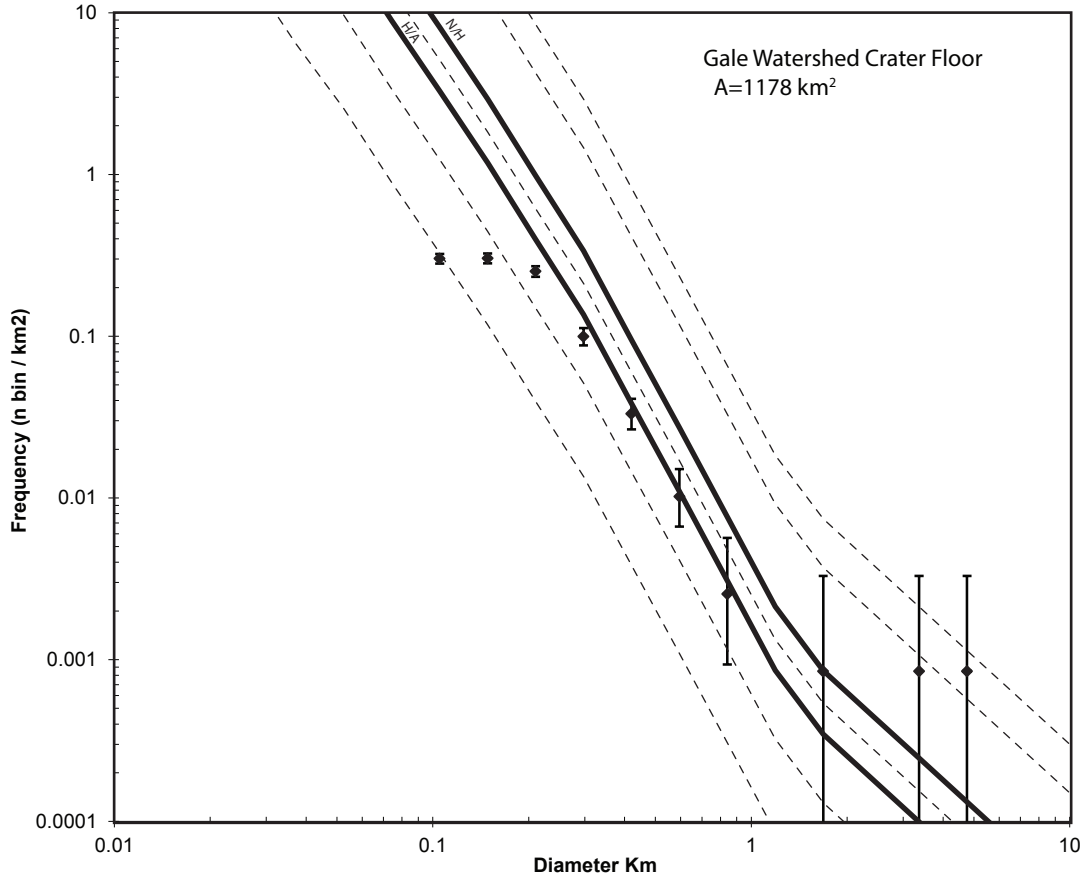
C


Floor beneath chloride unit
A=421 km² (CTX count)
Chloride Cap Unit
A=29.4 km² (HiRISE count)
H/A
N/H
Frequency (n bin / km2)
Diameter Km
10
1
0.1
0.01
0.001
0.0001
0.01
0.1
1
10

D


Sharp Watershed Crater Floor
A=5330 km²
H/A
N/H
Frequency (n bin / km2)
0.1
0.01
0.001
0.0001
0.00001
0.01
0.1
1
10
Diameter Km

E


Gale Watershed Crater Floor
A=1178 km²
H/A
N/H
Frequency (n bin / km2)
10
1
0.1
0.01
0.001
0.0001
0.01
0.1
1
10
Diameter Km